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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/606,176	06/25/2003	Osamu Goto	09792909-5625	3458
26263	7590	08/17/2006	EXAMINER	
SONNENSCHN NATH & ROSENTHAL LLP			NADAV, ORI	
P.O. BOX 061080			ART UNIT	
WACKER DRIVE STATION, SEARS TOWER			PAPER NUMBER	
CHICAGO, IL 60606-1080			2811	

DATE MAILED: 08/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/606,176

Applicant(s)

GOTO ET AL

Examiner

Ori Nadav

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 146-171, 173 and 175-209 is/are pending in the application.
- 4a) Of the above claim(s) 146-170 and 177-205 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 171, 173, 175, 176 and 206-209 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 206-209 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no support in the embodiment of figure 6 for a cap layer having a band gap always larger than that of the p-type clad layer, as recited in claim 206.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 171, 173, 175-176 and 206-209 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schetzina (5,670,798) in view Ibbetson et al. (6,515,313).

Schetzina teaches in figure 3 and related text a semiconductor light emitting device comprising:

- an active layer 112 InGaN made of a first nitride III-V compound semiconductor containing In and Ga;

- an optical guide layer GaN in contact with the active layer and made of a second nitride III-V compound semiconductor containing Ga (column 10, lines 31-34);

- a cap layer AlGaN 114a in contact with the optical guide layer and made of a third nitride III-V compound semiconductor containing Al and Ga; and

- a p-type clad layer AlGaN 122a in contact with the cap layer and made of a fourth nitride III-V compound semiconductor containing Al and Ga and different from the third nitride III-V compound semiconductor, wherein

- the cap layer has a band gap always larger than that of the p-type clad layer (see figure 4A), and wherein the cap layer is $\text{Al}_y\text{Ga}_{1-y}\text{N}$ (where $0 \leq y < 1$).

Schetzina does not teach the thickness of the cap layer which is located between the active layer and the cladding layer.

Schetzina teaches in the embodiment of figure 30 the thickness of the active layer 112c as being between 3-10 nm, and the thickness of the barrier layer 112a located between the active layer and the cladding layer 114c as being 20-100 nm.

Ibbetson et al. teach in the embodiment of figure 3A the thickness of the cladding layer 4 between 1-100 nm.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a cap layer, located between the cladding layer and the

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active layer, having a thickness between 2-20 nm, in Schetzina's device, in order to reduce the size of the device without compromising the characteristics of the device, and in order not to deviate from the disclosed thicknesses of the various layers which determine the overall size of Schetzina's device.

It has been held in that the applicant must show that a particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990). Note that the law is replete with cases in which when the mere difference between the claimed invention and the prior art is some dimensional limitation or other variable within the claims, patentability cannot be found. The instant disclosure does not set forth evidence ascribing unexpected results due to the claimed dimensions. See Gardner v. TEC Systems, Inc., 725 F.2d 1338 (Fed. Cir. 1984), which held that the dimensional limitations failed to point out a feature which performed and operated any differently from the prior art.

Note further that the broad recitation of the claim does not require the layers to be in direct contact with each other.

Regarding claim 206, the cap layer has a band gap always larger than that of the p-type clad layer, because as depicted in figure 4A, the p-type clad layer always has an average band gap which is larger than that of the p-type clad layer.

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Regarding claims 175 and 208, Schetzina teaches in the embodiment of figure 3 substantially the entire claimed structure, as applied to claim 171 above, except an undoped optical guide layer. Schetzina teaches in the embodiment of figure 29 an undoped optical guide layer 124c. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an undoped optical guide layer in Schetzina's device in order to use the device in an application which requires an undoped optical guide layer.

Regarding claims 176 and 209, Schetzina does not teach an optical guide layer having a thickness equal to or more than 8 nm. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an optical guide layer having a thickness equal to or more than 8 nm, in Schetzina's device, in order to optimize the characteristics of the device according to the requirements of the application in hand.

Response to Arguments

Applicant argues that it is well known that cladding layers have thickness in the order of microns rather than in the order of nanometers. "Thus, the thickness of cladding layers sandwiching an active layer should be at least in the sub-micron order in the case of GaN based materials. Accordingly, one skilled in the art manufacturing a

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device according to the disclosure in Schetzina would not consider using cladding layer 114a with a thickness equal to or more than 2 nm and equal to or less than 20 nm.”

Applicant forms a device wherein cladding layers have thickness in the order of nanometers. Ibbetson et al. teach a cladding layer having a thickness between 1-100 nm. It is therefore unclear why an artisan would not be motivated to form the cladding layer 114a of Schetzina with a thickness equal to or more than 2 nm and equal to or less than 20 nm.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ori Nadav whose telephone number is 571-272-1660. The examiner can normally be reached between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

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you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Ori Nadav', is positioned above the printed name.

O.N.
8/5/06

ORI NADAV
PRIMARY EXAMINER
TECHNOLOGY CENTER 2800